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## **Planar GaAs Schottky diodes integrated with quartz substrate circuitry for waveguide subharmonic mixers at 215 GHz**

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### **ABSTRACT**

A novel fabrication procedure is described which integrates a GaAs active device with passive quartz microstrip circuitry to form a hybrid-substrate millimeter-wave integrated circuit structure. The procedure is used to form antiparallel-pair Schottky-barrier diodes and integrated subharmonic mixer filter circuitry at 215 GHz. A single sideband noise temperature of 2350 K and conversion loss of 10 dB has been achieved with this configuration, which is only slightly higher than the best results obtained from either whisker contacted diodes or discrete planar diode structures. Reduction of the device parasitic capacitance to levels consistent with state-of-the-art discrete planar diodes, by slight modification of the current fabrication process, is expected to bring the noise and conversion loss down below that of the best reported subharmonic mixers at this frequency.